

## Advanced Cathode for Ultra-High Energy Li-Ion Batteries, Phase I

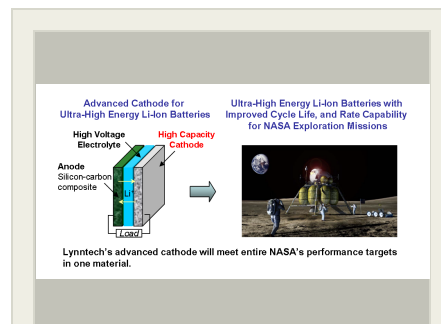
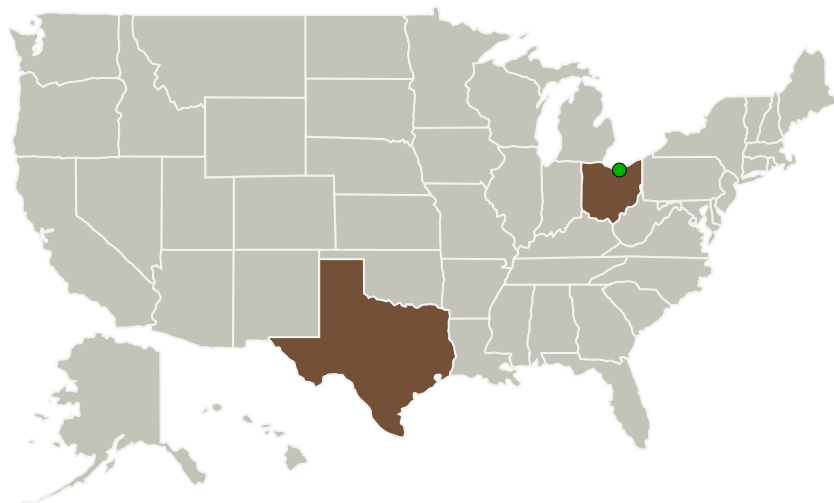
Completed Technology Project (2013 - 2013)



## Project Introduction

Advanced lithium-ion (Li-ion) batteries are currently under development for Extravehicular Activity Suits, Altair Lunar Landers, and Lunar Mobility Systems. However, low voltage operation and low capacity cathode of current Li-ion batteries limits both volumetric and gravimetric energy density. High capacity cathode materials with high voltage operation are needed to offer the required gains at the integrated cell level to meet NASA's goal. Lynntech proposes to develop advanced cathode that can work at high potential and provide high capacity, long cycle life, and high rate capability. During Phase I project, Lynntech will synthesize the cathode materials, optimize the compositions and structures, evaluate the cathode's properties, and determine the performance of cathodes in half cell and full cell containing high voltage electrolyte and silicon-carbon composite anode. The technology is currently estimated at TRL 3 and is expected to result in TRL 4 at the end of the Phase II project. The advanced cathode can enable ultra energy density Li-ion batteries which can provide significant mass and volume savings and operational flexibility for NASA near-term exploration missions.

## Primary U.S. Work Locations and Key Partners



Advanced Cathode for Ultra-High Energy Li-Ion Batteries

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Organizations Performing Work	Role	Type	Location
Lynntech, Inc.	Lead Organization	Industry	College Station, Texas
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

## Primary U.S. Work Locations

Ohio	Texas
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## Project Transitions

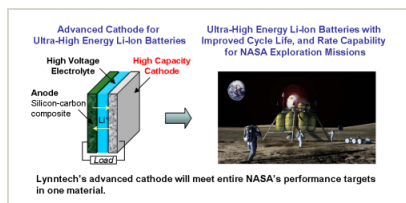
▶ **May 2013:** Project Start

✓ **November 2013:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137954>)

## Images



## Project Image

Advanced Cathode for Ultra-High Energy Li-Ion Batteries  
(<https://techport.nasa.gov/image/127811>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

Lynntech, Inc.

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

Carlos Torrez

## Principal Investigator:

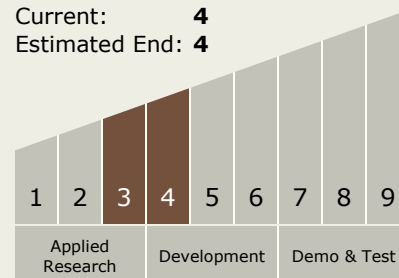
Christopher Rhodes

## Technology Maturity (TRL)

Start: **3**

Current: **4**

Estimated End: **4**



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## Technology Areas

### Primary:

- TX03 Aerospace Power and Energy Storage
  - └ TX03.2 Energy Storage
    - └ TX03.2.1 Electrochemical: Batteries

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System